

TRANSLATION

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference K 63 060/8	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/EP2004/012299	International filing date (<i>day/month/year</i>) 29.10.2004	Priority date (<i>day/month/year</i>) 29.10.2003	
International Patent Classification (IPC) or national classification and IPC C02F3/28			
<p>Applicant HERDING GMBH FILTERTECHNIK</p>			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of 6 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/EP	Authorized officer
Facsimile No.	Telephone No.

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/EP2004/012299

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

This report is based on translations from the original language into the following language _____, which is the language of a translation furnished for the purposes of:

international search (Rule 12.3 and 23.1(b))
 publication of the international application (Rule 12.4)
 international preliminary examination (Rule 55.2 and/or 55.3)

2. With regard to the **elements** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

the international application as originally filed/furnished
 the description:

pages 1-13 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____

the claims:

nos. _____ as originally filed/furnished

nos.* _____ as amended (together with any statement) under Article 19

nos.* 1-23 received by this Authority on 05.12.2005 with letter

nos.* _____ received by this Authority on of 05.12.2005

the drawings:

sheets 1, 2 as originally filed/furnished

sheets* _____ received by this Authority on _____

sheets* _____ received by this Authority on _____

a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. The amendments have resulted in the cancellation of:

the description, pages _____
 the claims, nos. _____
 the drawings, sheets/figs _____
 the sequence listing (*specify*): _____
 any table(s) related to sequence listing (*specify*): _____

4. This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

the description, pages _____
 the claims, nos. _____
 the drawings, sheets/figs _____
 the sequence listing (*specify*): _____
 any table(s) related to sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/012299

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1–23	YES
	Claims		NO
Inventive step (IS)	Claims	1–23	YES
	Claims		NO
Industrial applicability (IA)	Claims	1–23	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

1. The subject matter of claim 1 relates to a hybrid reactor for anaerobic wastewater treatment which combines a UASB (Upflow Anaerobic Sludge Blanket) reactor with a fixed-bed reactor.

2. D7 is considered to be the prior art closest to the subject matter of claim 1. D7 discloses a hybrid reactor, an Upflow Blanket Filter (UBF), for anaerobic water treatment, said reactor having a fixed bed with immobilized biomasses in its upper part, whereas the lower part comprises an open area for microorganism pellets (D7: page 410 and page 411, figure 1C). A separator system that separates the biogas from the UASB region located underneath and conducts it towards the outside through a central line is provided at the lower end of the fixed-bed region.

3. The subject matter of claim 1 differs from the teaching of D7 in that a separator system for retaining microorganisms is provided in the upper region between the upper reactor limitation and the fixed-bed support elements, i.e. above the

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fixed bed and not underneath it as in D7.

4. The problem to be solved by the present invention can therefore be regarded as that of making possible continuous, and thus more effective, elimination of contamination by microorganism pellets also in the fixed-bed region while keeping the microorganism pellets in the lower reactor part for water treatment in the UASB region.
5. In the separator system in D7, the microorganism pellets are separated from adhering gas bubbles and therefore lose buoyancy. These pellets therefore sink back down, allowing the upwards-flowing wastewater to flow into the fixed-bed region without the pellets. According to claim 1, the gas-separating process is carried out higher up, above the fixed bed. Thus the pellets are made to sink back down only after having passed through the fixed bed, and thus there is no spatial separation in the elimination of contamination by microorganism pellets and in that of contamination by sessile microorganisms in the fixed bed. D7, like the remaining available prior art, contains nothing that would prompt a person skilled in the art to separate the conventional combination of separator system and UASB reactor and to position the separator system above the fixed bed of a hybrid reactor.
6. In light of the available prior art, the subject matter of claim 1 therefore appears to be novel

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PCT/EP2004/012299**Box No. V** **Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

and involve an inventive step. As a result, the subject matter of claims 19, 22 and 23, which relate to a corresponding method and used of the hybrid reactor, meets the PCT requirements for novelty and inventive step. The same applies to claims 2 to 18, 20 and 21, since these claims are dependent on claims 1 and 19, respectively.